

PATENT ABSTRACTS OF JAPAN

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(54) REFLECTION TYPE SCREEN FOR LIGHT ROOM

(57)Abstract:

PURPOSE: To enjoy an image projected from a projector with high contrast even in a light room by successively forming a black base material layer, reflecting layer containing an aluminum pigment, and light diffusion layer.

CONSTITUTION: This reflection type screen for light room consists of a black material layer 1, reflecting layer 2 containing an aluminum pigment, and light diffusion layer 3. As for the light diffusion layer, a plastic film having ≤ 50 haze value can be used. As for the aluminum pigment, a flake aluminum pigment can be used. The reflecting layer 2 can be formed by alternately depositing layers containing the aluminum pigment and no pigment, and further the reflecting layer 2 may consist of plural laminated layers of transparent films printed with ink containing aluminum pigment. Thus, light with rather small incident angle to the screen can be mostly reflected as a mirror reflection in the reflecting layer 2.

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CLAIMS

[Claim(s)]

[Claim 1] The reflective mold screen for ** rooms characterized by having carried out the laminating of a black base material layer, the reflecting layer containing an aluminum pigment, and the optical diffusion layer one by one, and being formed.

[Claim 2] The reflective mold screen for using 50 or less plastic film as said optical diffusion layer ** [value / Hayes] rooms according to claim 1.

[Claim 3] The reflective mold screen for ** rooms according to claim 1 said whose

aluminum pigment is a scale-like aluminum pigment.

[Claim 4] The reflective mold screen for ** rooms according to claim 1 with which said reflecting layer carries out the laminating of the layer containing an aluminum pigment, and the layer which is not included by turns, and is formed.

[Claim 5] The reflective mold screen for ** rooms according to claim 1 in which said reflecting layer carries out two or more sheet laminating of the bright film which printed the front face, and is formed in the ink containing an aluminum pigment.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] the reflective mold screen used when this invention looks at projection images, such as OHP (overhead projector) and a liquid crystal projector, -- starting -- the still more detailed bright interior of a room -- also setting -- high -- it is related with the reflective mold screen for ** rooms with which a contrast projection image is seen.

[0002]

[Description of the Prior Art] Although current and OHP spread and it is used widely in the school, the firm, etc., when projecting an image by this OHP, the reflective mold screen which has a usually white front face is used.

[0003]

[Problem(s) to be Solved by the Invention] However, if the conventional reflective mold screen had the outpatient department light from indoor lighting and an indoor aperture, since the contrast ratio of the image projected on the screen would fall and it would stop being able to be visible easily, where it made the room dark, that is, light other than a projector is intercepted, it was used. Therefore, even if the observer wanted to take a memorandum etc. with a hand during OHP use, since it was difficult, everybody sensed inconvenience. In especially the liquid crystal projector in which the brightness of the light source is inferior to OHP, it is still more so.

[0004] In addition, there were some which applied the pearl pigment white vinyl chloride and on it as an ingredient of a reflecting layer conventionally in order to have raised the brightness of an image more, but since screen gain was low, it was not able to be used unless this also made the room dark. Moreover, although there was also a thing using aluminium foil and an aluminum plate as a reflecting layer, there are many specular reflection components and the screen glared, and contrast was also inadequate and it was not able to be used in the bright interior of a room.

[0005] It aims at offering the reflective mold screen for ** rooms which can admire the image projected from the projector also in the bright interior of a room by high contrast, without making this invention in view of such a conventional technical problem, and being influenced by outpatient department light and indoor lighting.

[0006]

[Means for Solving the Problem] The reflective mold screen for ** rooms of this invention carries out the laminating of a black base material layer, the reflecting layer containing an aluminum pigment, and the optical diffusion layer one by one, and is formed in order to solve the above-mentioned technical problem.

[0007] As the above-mentioned optical diffusion layer, the Hayes value can use 50 or less plastic film.

[0008] A scale-like aluminum pigment can be used for the above-mentioned aluminum pigment.

[0009] The above-mentioned reflecting layer can carry out the laminating of the layer containing an aluminum pigment, and the layer which is not included by turns, and can form it.

[0010] Moreover, in the ink containing an aluminum pigment, the above-mentioned reflecting layer can carry out two or more sheet laminating of the bright film which printed the front face, and can form it.

[0011] Hereafter, the configuration of this invention is explained further in full detail.

[0012] Drawing 1 is the sectional view showing the configuration of one example of the

reflective mold screen for ** rooms of this invention, and has composition which carried out the laminating of a reflecting layer 2 and the optical diffusion layer 3 one by one on the black base material layer 1.

[0013] The black base material layer 1 can use the chlorination vinyl sheet containing carbon black etc. The base material layer was made black because [of the improvement in contrast of the outpatient department absorption of light and an image].

[0014] A reflecting layer 2 is painted on the black base material layer 1 using the printing technique, such as the usual method of application or gravure, and the silk screen, in the plastic paint which comes to contain an aluminum pigment and contains an aluminum pigment in resin, such as a vinyl system and acrylic. As for especially an aluminum pigment, in this invention, it is desirable to use a scale-like thing. A scale-like aluminum pigment is easily obtained by grinding aluminium foil. Moreover, the pigment of the shape of a scale which grinds the polyester film which carried out the vacuum plating of aluminium of the front face, and is acquired can also be used as an aluminum pigment of this invention.

[0015] If a paint film dries, the scale-like aluminum pigment 4 is distributed with directivity so that it may stand in a line in parallel with a base material side within a layer, and it is distributed so that it may see from a transverse plane and may overlap mostly (refer to drawing 2). Moreover, it is desirable to distribute the scale-like aluminum pigment 4 with a certain amount of spacing at this invention, and it is desirable to be distributed in a layer with a certain amount of thickness. As opposed to the resin 5 with which the content of an aluminum pigment constitutes a reflecting layer 2 - 30 weight sections 0.5 - 5 weight section extent is desirable. Moreover, as for the thickness of a reflecting layer 2, it is desirable that it is 20 micrometers or more.

[0016] Moreover, a reflecting layer 2 may not be a monolayer configuration containing an aluminum pigment. For example, you may be the configuration formed by carrying out the laminating of the layer containing an aluminum pigment, and the layer which is not included by turns. Moreover, the configuration formed in the ink containing an aluminum pigment by carrying out two or more sheet laminating of the bright film which printed the front face can also be taken.

[0017] The optical diffusion layers 3 are embossing and the film which carried out mat coating about a front face, and transparence thermoplastics, such as extension polypropylene (OPP), a vinyl chloride, polyethylene terephthalate (PET), and triacetyl cellulose (TAC), is used. This optical diffusion layer 3 has also achieved the duty as a surface protective layer, and a laminating is carried out through adhesives on a reflecting layer 2. Moreover, 50 or less thing has the desirable Hayes value which

shows the rate of the scattered light to incident light.

[0018]

[Function] It is in this configuration, and as shown in drawing 2 , in being the incident light a with the comparatively small incident angle to a screen, most of the reflected light follows specular reflection in a reflecting layer 2. Therefore, since the light from a projector has the small incident angle, all will almost be reflected. Incidentally When carrying out screen projection at the screen of 100 inch size, it is the distance from a screen to the whole lens surface. Although it is about 4.6m, an incident angle is 0 degree in this case at the front of a lens, and the incident angle in the edge of a screen is about 15 degrees.

[0019] On the other hand, since incidence of the outpatient department light from an aperture or the light from an indoor lighting system will be carried out [from / inclination / of the aluminum pigment 4 of the shape of a scale which saw from the transverse plane and overlapped mostly to the screen since the incident angle was generally the big incident light b], its rate which reflects between pigments and is absorbed in the 1st page of a black base material layer increases.

[0020] consequently, the reflected light from a projector is bright, without receiving effect in outpatient department light or the indoor illumination light in any way also in the bright interior of a room -- high -- a contrast projection image is obtained. Moreover, there are few differences of the brightness of the core of a screen and a periphery, and a projection image becomes legible.

[0021]

[Example] Hereafter, an example explains this invention still more concretely.

[0022] As a layer containing an example 1 aluminum pigment, they are 25 weight sections and vinyl system resin about the scale-like aluminum pigment of 15 microns of mean diameters. Spreading formation of the ink which consists of the 100 weight sections was carried out using the silk screen printing method on the chlorination vinyl sheet of entering [layer / with a thickness of 20 microns] glass fabrics. The chlorination vinyl sheet used the black thing containing carbon black.

[0023] Furthermore, the laminating of the 100-micron transparence chlorination vinyl sheet was carried out with adhesives as a surface [an optical diffusion layer-cum-] protective layer to the front face, and the reflective mold screen was created in it. The front face of a transparence chlorination vinyl sheet performed embossing of crepe for diffusion of light, and used the thing of the Hayes value 35.

[0024] When projection measurement is carried out by liquid crystal projector HV-100 (Sharp Corp. make) using this screen, a screen gain SG value 4.8 Contrast ratio The

bright screen of 3.5 was obtained. Indoor brightness at this time Although it was 100 lux and was the environment where image sufficient on the usual screen was not acquired, even if it saw the image, in the screen of this example, it was what is sufficient for admiration enough.

[0025] In addition, the above-mentioned screen gain SG value and a contrast ratio are [0026], respectively.

[Equation 1]

Although it came out and defined, in this example, it measured using the luminance meter and the illuminometer, and these values were calculated by the upper type.

[0027] As a layer containing an example 2 aluminum pigment, the scale-like aluminum pigment 10 weight section with a mean particle diameter of 15 microns, Acrylic resin Two kinds of ink, the ink which consists of the 100 weight sections, and the invisible writing ink which does not contain a pigment, is prepared. Spreading formation of these ink is first carried out using gravure process printing on the chlorination vinyl sheet of entering [layer / with a thickness of 5 microns / aluminum pigment content] glass fabrics. The 5-micron clear layer was formed in piles on it, and three layers of layers which contain an aluminum pigment by turns, and a total of five clear layer two-layer layers were formed. The chlorination vinyl sheet used the black thing.

[0028] Furthermore, the laminating of the 100-micron transparenence chlorination vinyl sheet was carried out with adhesives as a surface [an optical diffusion layer-cum-] protective layer to the front face, and the reflective mold screen was created in it. The front face of a transparenence chlorination vinyl sheet performed embossing of crepe, and used the thing of the Hayes value 35.

[0029] When projection measurement is carried out by the liquid crystal projector like an example 1 using this screen, SG value 4.8 Contrast ratio The bright screen of 3.5 was obtained. Indoor brightness at this time Although it was 100 lux, even if it saw the image, it was what is sufficient for admiration enough.

[0030] They are the scale-like aluminum pigment 10 weight section with a mean particle diameter of 25 microns and acrylic resin as ink containing an example 3 aluminum pigment. What was mixed in the 100 weight sections was prepared, and three things which printed this ink on the front face of the transparence PET film of 25-micron thickness using gravure were created. Next, the laminating of this film of three sheets was carried out to the chlorination vinyl sheet containing glass fabrics, and the reflecting layer was formed. The chlorination vinyl sheet used the black thing.

[0031] Furthermore, the laminating of the 100-micron transparence chlorination vinyl sheet was carried out with adhesives as a surface [an optical diffusion layer-cum-] protective layer to the front face, and the reflective mold screen was created in it. The front face of a transparence chlorination vinyl sheet performed embossing of crepe, and used the thing of the Hayes value 35.

[0032] When projection measurement is carried out by the liquid crystal projector like an example 1 using this screen, SG value 4.5 Contrast ratio The bright screen of 3.0 was obtained. Indoor brightness at this time Although it was 100 lux, even if it saw the image, it was what is sufficient for admiration enough.

[0033]

[Effect of the Invention] In order for the reflective mold screen of this invention to reflect the light which comes from a projector by having carried out the laminating of a black base material layer, the reflecting layer containing an aluminum pigment, and the optical diffusion layer one by one, and having formed them as explained to the detail above, and to absorb outpatient department light and the indoor illumination light effectively, the outstanding effectiveness that the image projected from the projector also in the bright interior of a room can be admired by high contrast is done so.

[0034] Moreover, the reflective mold screen of this invention has high reflective brightness, and since there are few differences of the brightness of the core of a screen and a periphery, a bright legible image is acquired. furthermore, since the black base material is used, the appearance of a screen carries out a little and is **** -- it becomes a color and the good image of contrast is acquired.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing the configuration of one example of the reflective mold screen for ** rooms of this invention.

[Drawing 2] It is the explanatory view showing the situation of the reflection of light which carried out incidence on a screen.

[Description of Notations]

1 Black Base Material Layer

2 Reflecting Layer

3 Optical Diffusion Layer

4 Scale-like Aluminum Pigment